



Activity
Connecting with intelligence

ThingPark Infrastructure Commissioning Service (ICS)

How-to guide for Network Administrators

February 2025

Agenda

- ICS introduction
- ICS tasks for Network Administrators
- Tasks reserved to other ICS roles
- General GUI tips

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Infrastructure Commissioning Service (ICS) – Scope

Support the following actions on ThingPark Base Stations (BS):

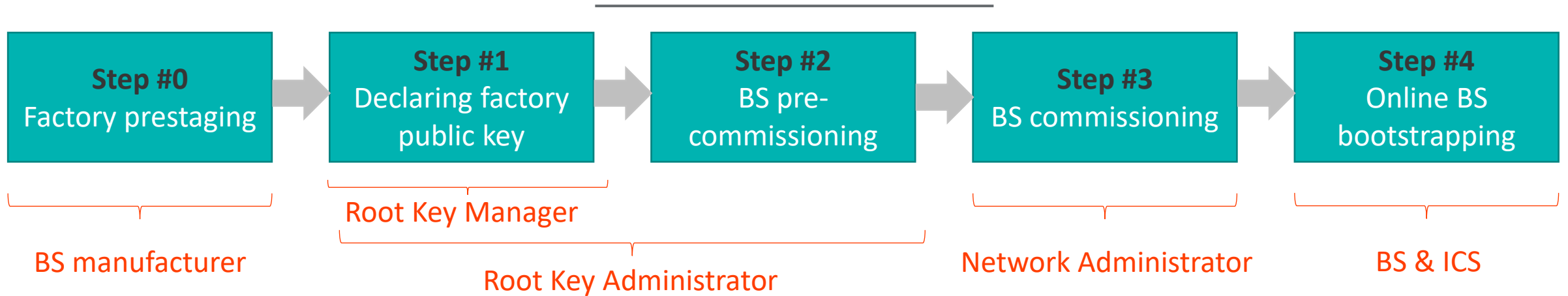
- Zero-touch bootstrapping: BS retrieves its LRR package/BS image and related configuration settings without being accessed by the Network Administrator. Zero-touch bootstrapping also covers TPE-All-in-One gateways.
- Remote configuration updates, e.g., network interfaces (ethernet, cellular, WiFi), NwkID filters, IP-tables, NTP servers...
- Software upgrade: partially supported (full support is planned in the coming release)

Supported gateway manufacturers:

Browan, Kerlink, Tektelic, MultiTech, Milesight and Ufispac

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Base Station bootstrapping flow



- **Step #0:** The BS is factory-prestaged by the manufacturer, embedding an Activity-generic Factory Agent + BS-specific security token (using public/private key pair) to authenticate the BS's initial access to ICS
- **Step #1:** Root Key Administrator/Manager declares the manufacturer's public key (typically common to a given batch) in ICS
- **Step #2 - BS pre-commissioning:** Root Key Administrator declares BS (unitary or bulk) in ICS and generates an Owner Key that should be transferred to the BS owner (aka Network Administrator)
- **Step #3 – BS commissioning:** Network Administrator provisions the BS (unitary or bulk) under their ICS account, using Owner Key, and associates it/them with the target configuration
- **Step #4:** Once a commissioned BS initiates a connection request to ICS, the bootstrapping process will be automatically triggered, starting from installing the right BS image until personalizing its configuration

ICS roles

- **ICS Administrators**

- Reserved to Actility personnel: Technical Managers, BS Validation team, Project/Account Managers

- **Root Key Administrators**

- Reserved to Actility personnel: typically, Actility's logistics team

- **Root Key Managers**

- Gateway partners: e.g. Foxconn, Browan, Kerlink...

- **Network Administrators**

- **For TPW:** Operator's RAN team, typically associated with Network Partner role and have read/write access to Network Manager
- **For TPE:** Typically, the Channel Partner/Distributor or the System Integrator. Could also be the end-customer whenever relevant

Prerequisites

ICS is a SaaS service hosted on Actility's cloud core network.

Therefore, during the bootstrapping phase (i.e., installation of ThingPark BS image + personalization of the BS configuration), the BS must have:

1. internet access to reach the SaaS-based ICS server,
2. a working ethernet network connection.

Note Bootstrapping may be done in lab environment (with internet) if BS is not authorized to connect to internet once it is physically deployed in the field.

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- **ICS tasks for Network Administrators**
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ICS tasks for Network Administrators

1. Declare a new self-hosted TPE platform (aka TPE-OCP)
2. View SaaS platform details, in ready-only mode
3. Manage the Operator configuration for self-hosted TPW platforms, included in their scope, whenever the platform-generic configuration is overwritten by operator-specific configuration
4. View networks associated with their scope

Note A Network is defined by the tuple {Platform-ID, Operator-ID, Network-Partner-ID}, it is automatically declared by ICS for each distinct tuple (Network Admin does NOT need to create Networks).
5. Define and manage custom configuration for BS under their scope
6. Commission BS under their account (using Owner Key), either unitary or bulk commissioning (through csv import). BS may be commissioned as conventional gateway (LRR-only) or TPE-All-in-One gateway
7. Make existing BS ICS-compatible even if it hadn't been factory-prestaged with ICS
8. Manage BS under their account: View BS status and access ICS logs, edit BS, export BS list and decommission BS (i.e., remove it from their account and move back to “pre-commissioned” status)

Platform Management (1/2)

■ Declaring a new TPE-OCF platform:

1

Platform identifier : provided by Activity, it must be unique.
Supported charset : [A-Za-z0-9-_-]+

2

Platform name: use a friendly name.
Both fields are useful for later search

PLATFORM INFORMATION

Platform Identifier* ✓

Platform Name* ✓

Platform Type* X

Public IP addresses* ✓

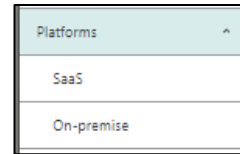
3

Set the public IP addresses

- this is the primary address for a TPE-OCF standalone.
- This is a list of the primary node followed by the secondary node for a TPE-OCF HA

Platform Management (2/2)

- Searching, viewing and editing:
 - from the menu, you can restrict the list
 - all platforms (no restriction)
 - SaaS
 - On-premise (OCP)
 - SaaS platforms are read only
 - username and password are hidden or encoded
 - TPE OCP
 - you can change any field, at any time
 - changing the IP addresses will cause a complete reconfiguration of all attached Base Stations



Name (Identifier)	Types	Networks	Creation	Last Update	
Integration-tpcaen (integration-tpcaen)	TPE-SaaS	0	Today - 10:24:42	-	...
test-customer1 (tpe-test-customer1)	TPE-OCP	0	Today - 12:23:04	-	...
test-customer2 (tpe-test-customer2)	TPE-OCP	0	Today - 12:23:37	-	...

PLATFORM INFORMATION

Platform Identifier* Platform Name*

Platform Type* Underlying Networks*

Created Romain Veillerot - 2021-11-04 - 09:59:11 Last update Romain Veillerot - 2021-11-04 - 09:59:11

PKI INFORMATION

Key installer servers* Default Prestager-ID*

☒ Use public key authentication

OSS-API INFORMATION

☒ Enable automatic transmission of Public Key on TWA

OSS-API base URI* OSS-API username* OSS-API password*

Operator Management (1/2)

- For SaaS platforms, the Operator configuration is directly managed by Actility
- For TPE OCP platforms, the Operator is automatically configured when the platform is declared in ICS
- For a TPW OCP platform, it is necessary to create it manually, the operator ID is provided by Actility

The screenshot shows a web form for creating an operator. It includes four numbered callouts:

- 1** Operator identifier : provided by NetOps.
Supported charset : [A-Za-z0-9-_-]+
The field 'Operator Identifier*' contains the value 'devel-ope' and has a green checkmark.
- 2** Operator Name: use a friendly name
Both fields are useful for later search
The field 'Operator Name*' contains the value 'TPW SaaS devel operator' and has a green checkmark.
- 3** Select the platform from the provided list
The field 'Platform Identifier*' is a dropdown menu showing 'Platform-TPW-SaaS-integration-tpcaen (integration-tpcaen)'.
- 4** Eventually force the Network Partner ID to be provided at base station creation.
This points to the checkbox 'Mandatory Network Partner for Base station commissioning', which is currently unchecked.

Operator Management (2/2)

- **Searching, viewing and editing:**
 - **This is only available for TPW-OCP**
 - You can change any field, at any time
 - Information provided at platform level is displayed, username and password are hidden or encoded
 - Overriding PKI / Core Network information fields will cause a complete reconfiguration of all the attached Base Stations

CORE NETWORK INFORMATION

☒ Override Platform Core network LRC information

LRC servers

LRC servers public IPv4/FQDN* ⓘ

10.100.31.141, 10.100.31.144

LRC servers private IPv4/FQDN* ⓘ

10.10.1.142, 10.10.1.143

☒ Override Platform of Core network FTP/SFTP information

SFTP servers

☒ Use SFTP for download/upload servers

SFTP download servers public IPv4/FQDN* ⓘ

10.100.31.141, 10.100.31.144

SFTP download servers private IPv4/FQDN* ⓘ

10.10.1.142, 10.10.1.143

SFTP download servers password* ⓘ

[039c469a31cd72b2f579aae0e061636caa666a9fb30aa626034301e261a0807f]

SFTP upload servers public IPv4/FQDN* ⓘ

10.100.31.142, 10.100.31.145

SFTP upload servers private IPv4/FQDN* ⓘ

10.10.1.141, 10.10.1.144

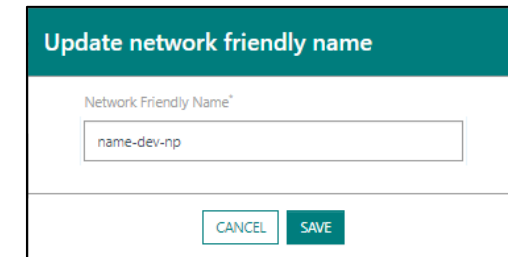
SFTP upload servers password* ⓘ

[436685f165f0c119269fcbd558922f91e15bbcc86e1086afaceb0cc6dd422bff]

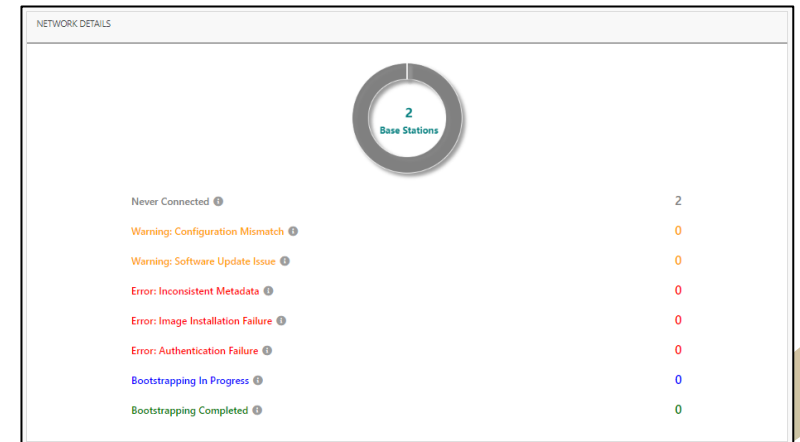
☐ Override Platform Core network SSH information

Network Management

- A network is automatically created by ICS for each {platform-ID, operator-ID, network-partner-ID} tuple.
- By default, the network's name is the Network-Partner-ID, but you may change it from the Networks list, by clicking ... then "Update".
- Clicking a network partner from the list redirects you to the list of Base Station belonging to that network partner.
- To see the statistics of a given network, click ... from the list, then "Details". This will show you a pie chart with the split of Base Station status for that network partner.



A dialog box titled "Update network friendly name". It contains a text input field labeled "Network Friendly Name*" with the value "name-dev-np". At the bottom, there are two buttons: "CANCEL" and "SAVE".



Custom BS Configuration

1

The first thing is to give a CONF-ID, this is a unique identifier for your configuration.
Supported charset : [A-Za-z0-9-_-]+

CONF-ID* ⓘ

ethernet-3G-ipsec



2

And provide a friendly description. Both fields are useful for later search.

Description* ⓘ

configuration file ethernet primary, 3G secondary, IPSEC



3

You can restrict the usage for this configuration :
Select the supported manufacturer and model.
Restrict the platform / operator / network partner that can use this configuration.

Manufacturer

Select Manufacturer

Model

Select Model

Platform

Select Platform

Operator

Select Operator

Network Partner

Select Network Partner

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Custom BS Configuration / network interfaces

4

Configure a primary interface, and optionally, a secondary interface:

- For Ethernet : set “Bandwidth restriction” to “no constraint”, then set DHCP or static IP mode.
- For WiFi: set “Bandwidth restriction”, DHCP or static IP, SSID, Security, password.
- For Cellular: set bandwidth restriction to “limited” or “very limited” according to your use case, then set APN, User, Password and Pin Code.

Primary Network Interface ⓘ

Ethernet

ETHERNET

Bandwidth Constraint ⓘ

no-constraint

DHCP ☒

Secondary Network Interface ⓘ

Select interface...

WIFI

Bandwidth Constraint ⓘ

no-constraint

DHCP ☒

SSID ⓘ

ACTIVITY_RESCUE ✓

Security ⓘ

WPA2

Password ⓘ

Activity2018@ ✓

CELLULAR

Bandwidth Constraint ⓘ

very-limited

APN ⓘ

m2m ✓

User ⓘ

actily ✓

Password ⓘ

OK8LM675 ✓

Pin Code ⓘ

987 ✓

IP ⓘ

192.168.1.1 ✓

Subnet Mask ⓘ

255.255.255.0 ✓

Gateway IP ⓘ

192.168.1.254 ✓

DNS servers ⓘ

8.8.8.8, 8.8.4.4 ✓

For a static IP, you must configure:
IP / Subnet / Gateway and DNS

Custom BS Configuration / PKI configuration

5

Configure the security that your Base Station will use when connecting to the platform: none, IPSEC, TLS.
IPSEC and TLS are mutually-exclusive.

Enable IPsec ☐ OFF

Enable TLS ☐ OFF

Custom BS Configuration / Time configuration

6

Configure the timezone, and the list of NTP servers that your Base Station will use

Timezone* ⓘ

Europe/Paris

NTP server list* ⓘ

0.pool.ntp.org, 1.pool.ntp.org



Custom BS Configuration / Firewall configuration

7

Optionally add specific incoming iptables rules for your Base Station. This can be useful, for example, if you need SSH access to your base station, knowing your local IP address.

If you want your base station to be accessible through SSH at any time, from any remote client (whether it is in the same LAN or not), set "Close SSH when connection to LRC is stable" = OFF.

Close SSH when connection to LRC is stable

☐ OFF

Source*	Protocol*	Port*
213.41.115.27 ✓	TCP ✕	22 ✓
* ✓	ICMP ✕	0
Allowed source...	Select protocol...	Set port...

Custom BS Configuration / Configuration parameters

8

For very specific usage, you can also provide custom parameters for lrr.ini, ipfailover2.ini, checkvpn2.ini, lgw.ini, channels.ini, custom.ini, nwfilter.ini files

Configuration File*	Parameter Section*	Parameter Name*	Parameter Value*
lrr.ini ✕	trace ✓	level ✓	4 ✓
checkvpn2.ini ✕	checkvpn2 ✓	tracelvl ✓	1 ✓
Select file...	lrc	nbirc	2

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Custom BS Configuration / Network-ID/DevAddr Filter

9

Optionally enable network-ID / DevAddr filtering, this will filter uplink packets based on allowed (whitelist) / forbidden (blacklist) DevAddr address prefixes.

Enable Filtering



Network-ID/DevAddr Filter* ⓘ

-00ba0bab,-0faaa52f,+8/4,+0/3



The syntax is a list of <prefix> <hexaprefix> "/" <bitmask> (comma separated)

- prefix:
 - '-' for a blacklist
 - '+' for a whitelist
- hexaprefix:
 - hexadecimal string representation of the Network-ID
- bitmask:
 - is the number of bit to consider

Unitary Commissioning of a new BS (1/3)

1

The Base Station must be already pre-commissioned. The list of Owner Keys corresponding to your LRR-UUIDs is provided to you by Actility. Here, you must set the LRR-UUID and Owner Key. Give a friendly name to your BS to easily find it later.

- If you want your BS to be bootstrapped via ICS, but you do not want it to get configuration or software updates from ICS after its initial bootstrap, activate the switch “Suspend base station updates after initial bootstrap”.
- If your BS already has a valid LRR software (which you don’t want to overwrite), but you want ICS to send configuration updates to your BS, activate the switch “Use ICS for base station configuration only”.

BASE STATION INFORMATION

LRR-UUID* ⓘ

012345-6789ABCDEF

Name ⓘ

Set Base station Friendly Name...

Owner Key* ⓘ

Enter provided Base station owner key...



OFF

Suspend Base station updates after initial bootstrap



OFF

Use ICS for Base station configuration only (if LRR is already installed)



Click this icon if your BS does not yet have the ICS factory agent. This could be the case of base stations already deployed in the field without being factory-prestaged in ICS mode.
This icon will copy a CLI (command line interface) command that you should execute on your BS to allow it to connect to ICS, install its factory agent and get commissioned. You need root access to run this command on the base station.

Unitary Commissioning of a new BS (2/3)

2

- Select the manufacturer / model
- Select the Platform / Operator / Network Partner (if any)
- You may manually edit the Network Partner ID
- You then have a list of CONF-ID that match your criteria in the CONF-ID drop-down menu
- You may activate the possibility to use a Beta LRR version on your Base Station.

BASE STATION CONFIGURATION

Manufacturer* ⓘ
Select Manufacturer

Model* ⓘ
Select Model

Platform* ⓘ
Select Platform

Operator* ⓘ
Select Operator

Network Partner ⓘ
Select Network Partner

CONF-ID* ⓘ
Select Configuration

Allow installation of Beta LRR version on the Base station ☐ OFF

If the Configuration associated with your BS uses a static IP address, you may overwrite this static IP at base station level.

NETWORK INTERFACES CONFIGURATION OVERRIDE

Override Ethernet static IP ☒ ON

Ethernet Interface Static IP* ⓘ
192.168.1.1/[24:[192.168.1.254]]

Unitary Commissioning of a new BS (3/3)

2'

If you want to use your base station as a TPE All-in-One gateway, you must be assigned "TPE All-in-One Manager" role by the ICS Administrator.

- Select the manufacturer / model (should be compatible with TPE All-in-One)
- Select **"Bootstrap this base station with TPE All-in-One"**
- Select the TPE All-in-One Manager who should be authorized to view/edit this base station
- You then have a list of CONF-ID that match your criteria in the CONF-ID drop-down menu

BASE STATION CONFIGURATION

Manufacturer* ⓘ

Model* ⓘ

Browan/Gemtek

ODU Macro v1.5

This Base station model supports following file types: LRR, Customization, Image, TPE All-in-One

☒ Bootstrap this Base station with TPE All-in-One

TPE All-in-One Manager ⓘ

Ramez Soss (ramez.soss@activity.com)

CONF-ID ⓘ

TAO-gemtekODU

Bulk Commissioning of a BS list

1

The Base Station must be already pre-commissioned and the list of Owner Keys corresponding to your LRR-UIDs is provided to you by Actility. Go to the Base Stations panel and:

- click the import button 
- consult the 2 samples:
 - one for the model list (this is useful to retrieve the manufacturer and model IDs that you should use for the csv import file)
 - one for the import sample file.
- Create a csv import file following the format provided by the sample.
 - To commission new BS, use the directive **CREATE_BS** in column A.
 - For TPE-All-in-One, set Platform-ID = ics-tao (see details in sample file)
 - Column "L" (Force Fresh Install) is ignored when column "A" is CREATE_BS. This column is only relevant for the UPDATE_BS directive.
- Import it
- During the import, you might encounter several errors, correct them and re import.

IMPORTING BASE STATIONS

Prepare Your Base Station Import File

Your file must be a well-formatted .csv file strictly compliant with the sample below.

Supported features are Base station CREATE, UPDATE, DELETE.

 MODEL LIST

 SAMPLE FILE

Upload Your Base Station Import File

Browse to select your file.

Click to browse...



IMPORT

Import 10 Base Station(s)

100%

10 Base station(s) successfully imported

GO TO BASE STATION LIST

BS Management (1/3)

■ Export BS list:



- You can export the full base station list using the export button 
- You can add a search criteria to reduce the list and export a selection

■ Bulk-update of the BS list:

1. Export the list of base stations you want to update.
2. For each BS to update, use the directive **UPDATE_BS** in column A.
3. Apply your modifications on each BS to update, then click  to reimport the list.

■ Bulk deletion of base stations:

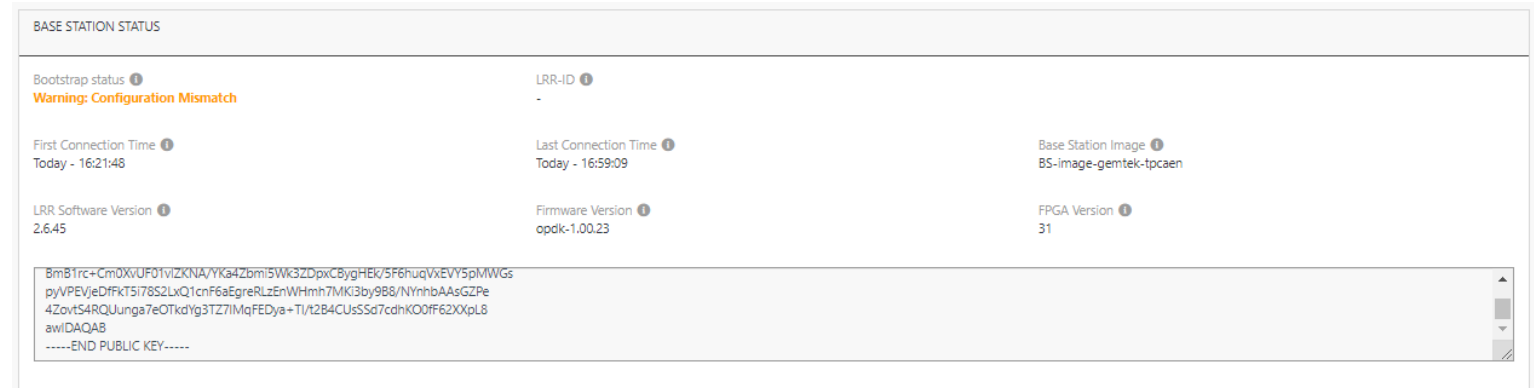
1. Prepare a CSV file of all the base stations that you want to decommission. Set **Delete_BS** in column A of this file and fill the LRR-UUID in column B, as per the sample file.
2. Import the csv file, by clicking  on the BS list.

BS Management (2/3)

■ Base Station Bootstrapping status:

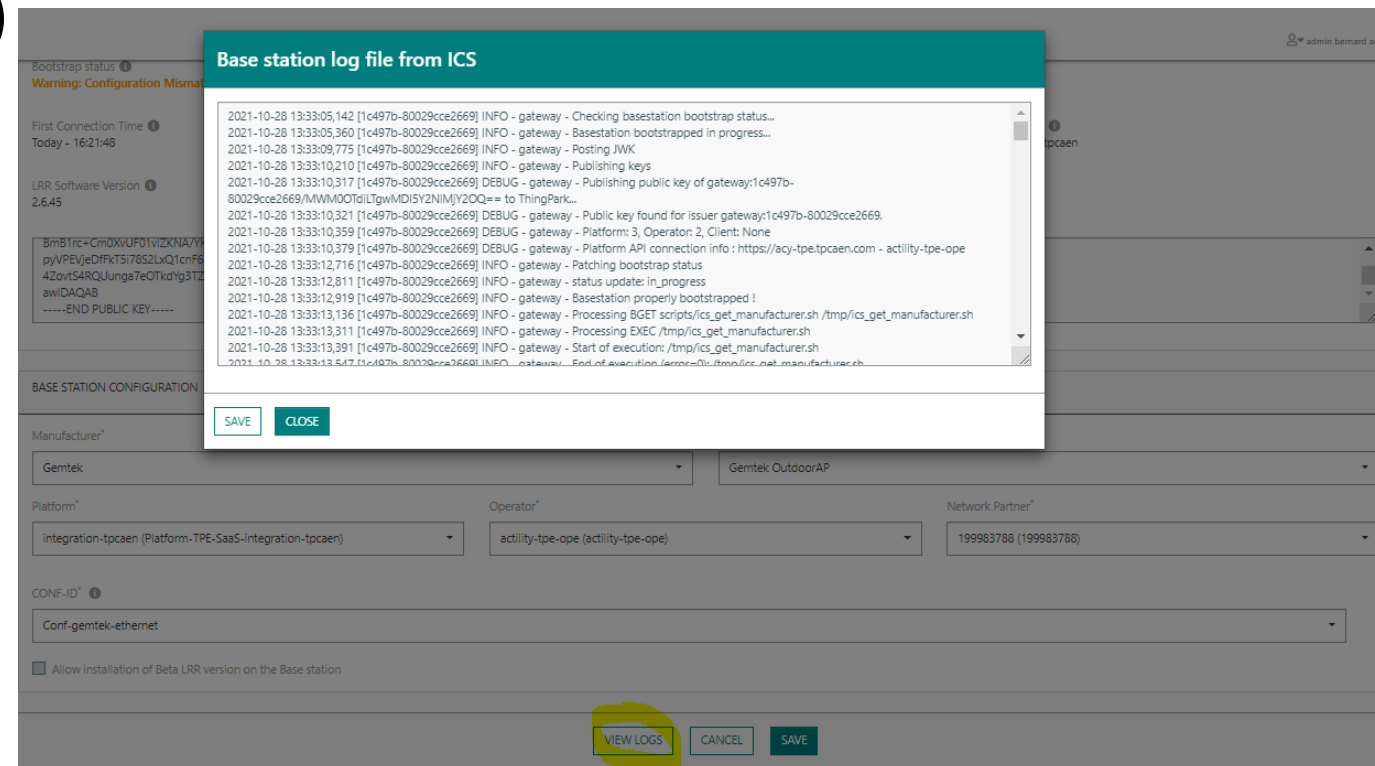
- The Base Station panel provides a list of indicators that will help to troubleshoot the Base Station bootstrapping phase, this includes

- Bootstrap status:
 - Never connected: Base Station has never been successfully connected using the factory token
 - Warning: Configuration Mismatch: ICS cannot apply the Base Station Configuration, this should require support for corrections
 - Warning: Software Update Issue: FFS
 - Error: Inconsistent Metadata (Manufacturer, Model or LRR-UUID): Incorrect Manufacturer / Model , or LRR-UUID (token not belonging to that BS)
 - Error: Image Installation Failure: ICS cannot install BS image, this should require Actility support for corrections
 - Error: Authentication Failure: Incorrect private key, this should not arrive, you must decommission and recommission the BS
 - Error: Base station no provisioned on TPW/TPE: ICS couldn't push the base station's public key because it is not yet provisioned in ThingPark.
 - Bootstrapping In Progress
 - Bootstrapping Completed
- Timestamp
 - First and last connections
- Versioning:
 - BS image
 - LRR Software version
 - Firmware version
 - FPGA version



BS Management (3/3)

- **View ICS logs for this BS:**
 - For troubleshooting, you can access the logs of the Base Station
 - These logs are regularly sent by the Base Station during its bootstrap phase
 - In case of problem with an incorrect status, you must provide these logs to Actility Support (select all / copy / paste)



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ICS tasks for Root Key Administrators/Managers

1. Declare, view, edit and delete the BS manufacturer's public keys set during factory prestaging process
 - Root Key Admin has access to all manufacturer keys.
 - Root Key Manager has access only to own manufacturer keys, cannot see keys declared by others. This role may be endorsed by BS manufacturers, making them autonomous to declare own factory-prestaging keys.
2. Pre-commission base stations (**reserved only to Root Key Administrators**)
 - Pre-commissioning process allows ICS to validate further commissioning requests through the Owner Key. This prevents any Network Admin from illegally attempting to commission a BS under their account and redirect it to point to a platform other than the legitimate one.
 - ICS supports 2 modes to generate Owner Keys:
 - Per base station: generates a separate Owner Key per BS. Use this option when the batch being pre-commissioning is destined to several customers/Network Admins.
 - Per batch: use this mode to simplify the communication of the Owner Key to the customer/ Network Administrator, when the whole BS batch will be sold to the same owner / Network Admin.
 - Owner Keys should be communicated to customers/Network Admins alongside shipped BS. Ideally, it should be included in QR code and printed on BS's sticker.

Tasks reserved to ICS Administrators

ICS Administrators have global read/write access to ICS, so they can perform all the tasks associated with other roles (Root Key Administrators and Network Administrators). Additionally, the following tasks can only be executed by ICS Administrators:

1. Add users and associate them with adequate roles.
 - ICS Administrators also define the scope of each Network Administrator, i.e. which Platforms, Operators and Network Partners each Network Admin may manage.
 - **Note** In the future, Actility Central shall automatically assign the TPE-SaaS subscription to each Network Admin (based on their common ID on ICS & Central).
2. Upload BS files (LRR, firmware, image...) to ICS and combine them into BS images (if an image consists of several files)
 - For each file/image, ICS Admin determines the HW compatibility matrix (manufacturer/model) and the eligible Platforms (optional).
3. Create and update Platforms & Operators in ICS (Network Admin can only create TPE-OCP types of platforms)

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Activity

List of items

Column sorting (ascending / descending)

Multi field search box, specific columns are included in the search (including hidden ones), they are described in this document

Creation button

Optional buttons

Column selection the selection is saved in browser local storage

3 ITEM(S)

Type your search...

Column 1	Column 2	Column 3	
item 1	TPW-SaaS	1	...
item 2	TPE-SaaS	0	...
item 3	TPE-SaaS	0	...

Delete

Details

Clicking on any column of the line will display the detail item panel (except for the action column)

Action list (depending on the item), can be:
Update
Details
Delete
Revoke
Decommission

Navigation: << < 1 > >>

THANK YOU



Actility